# A High-Order Shallow Water Model based on WENO Method on the Cubed-Sphere

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The weighted essentially non-oscillatory (WENO) finite-volume schemes have gained popularity in solving hyperbolic conservation laws. A main feature of WENO scheme is its capability to achieve arbitrary high-order formal accuracy in smooth regions and remain non-oscillatory at discontinuities. However, fully multi-dimensional WENO schemes are computationally expensive for many practical application, particularly for non-orthogonal curvilinear geometry such as the cubed-sphere grid system. We consider a fifth-order WENO scheme (WENO5) for solving shallow-water equations on the cubed-sphere, where the WENO algorithm is used in a dimension-split manner. The edges and corners of the cubed-sphere are discontinuous and create great difficulty for implementing numerical schemes which require wider computational stencils. However, the dimension-by-dimension approach employing 1D WENO5 simplifies the computational stencil and facilitate efficient parallel implementation. A high-order efficient interpolation procedure is adopted to maintain the accuracy of the reconstruction at the cubed-sphere edges. The WENO5 scheme has an option for monotonic (positivity-preserving) transport. The shallow water model is tested for a variety of benchmark test-suites on the cubed-sphere and results will be presented in the seminar.